

WHAT IS CLAIMED IS:

1. A catalyst for addition polymerization obtained by contacting (A), (B) and (C) described below:

5 (A) an organoaluminum compound,

(B) one or more of boron compounds selected from (B1) to (B3) below;

(B1) a boron compound represented by the general formula $BQ^1Q^2Q^3$,

10 (B2) a boron compound represented by the general formula $G^+(BQ^1Q^2Q^3Q^4)^-$, and

(B3) a boron compound represented by the general formula $(L-H)^+(BQ^1Q^2Q^3Q^4)^-$

(wherein each of Q^1 to Q^4 is independently a halogen atom, a hydrocarbon group, a halogenated hydrocarbon group, a heterocyclic group, a substituted silyl group, an alkoxy group, or a di-substituted amino group, and they may be the same or different. G^+ is an inorganic, organic or organometallic cation. L is a neutral Lewis base, and
15 (L-H)⁺ is a Brønsted acid.), and
20 (C) a solid inorganic compound.

2. The catalyst according to claim 1, wherein the organoaluminum compound is one or more of aluminum compounds selected from (A1) to (A4) below:

25 (A1) An organoaluminum compound represented by the general formula; $R_rAl(OR)_oH_pX_q^1$;

(A2) an organoaluminum compound represented by the

general formula; M^1AlR_4 ;

(A3) a cyclic aluminosiloxane having a structure represented by the general formula; $\{-Al(R)-O-\}_j$; and

(A4) an aluminosiloxane having a structure represented by the general formula; $R\{-Al(R)-O-\}_k AlR_2$

(wherein each of R's independently represents a hydrocarbon group having 1 to 20 carbon atoms; each of X^1 's independently represents a halogen atom; M^1 represents an alkaline metal atom; "r" represents a numeral satisfying $0 < r \leq 3$; "o" represents a numeral satisfying $0 \leq o < 3$; "p" represents a numeral satisfying $0 \leq p < 3$; "q" represents a numeral satisfying $0 \leq q < 3$; $r + o + p + q = 3$; "j" represents an integer of 2 or more; and "k" represents an integer of 1 or more.)

3. The catalyst according to claim 1, wherein the solid inorganic compound (C) is a Brønsted acid salt of an atom selected from the group consisting of metals of the Groups I to XVI of the Periodic Table of the Elements and silicon, or a layered silicate compound.

4. The catalyst according to claim 2, wherein the solid inorganic compound (C) is a Brønsted acid salt of an atom selected from the group consisting of metals of the Groups I to XVI of the Periodic Table of the Elements and silicon, or a layered silicate compound.

5. The catalyst according to claim 3, wherein the Brønsted acid salt is a halide of a metal atom represented by the general formula (1):



(wherein M^2 represents a metal atom selected from the Groups I to XVI of the Periodic Table of the Elements and X^2 represents a halogen atom. "m" represents a numeral of 1 or more, and "n" represents a product of a valence number of the metal atom and "m".).

6. The catalyst according to claim 4, wherein the Brønsted acid salt is a halide of a metal atom represented by the general formula (1):



(wherein M^2 represents a metal atom selected from the Groups I to XVI of the Periodic Table of the Elements and X^2 represents a halogen atom. "m" represents a numeral of 1 or more, and "n" represents a product of a valence number of the metal atom and "m".).

7. The catalyst according to claim 3, the Brønsted acid salt is an inorganic oxide selected from the group consisting of oxides of metals of the Group I to the Group XVI of the Periodic Table of the Elements and silicon.

8. The catalyst according to claim 4, the Brønsted acid salt is an inorganic oxide selected from the group consisting of oxides of metals of the Group I to the Group XVI of the Periodic Table of the Elements and silicon.

9. The catalyst according to claim 3, wherein the layered silicate compound is a clay mineral.

10. The catalyst according to claim 4, wherein the layered silicate compound is a clay mineral.

11. A process for producing an addition polymer, which comprises polymerizing an addition-polymerizable monomer in the presence of the catalyst of claim 1.

5 12. The process according to claim 11, wherein the addition-polymerizable monomer is a monomer selected from the group consisting of ethylene and α -olefins having 3 to 20 carbon atoms.

10 13. The process according to claim 11, wherein the addition-polymerizable monomer is a mixture of ethylene and an α -olefin having 3 to 20 carbon atoms.

14. The process according to claim 12, wherein the monomer is an α -olefin.

15 15. The process according to claim 14, wherein the produced polymer is a polymer of the α -olefin, having an isotactic fraction [mm] of more than 0.25.